

Two New Species of the Pseudoscorpion Genus *Paraliochthonius*

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The genus *Paraliochthonius* Beier of the Chthoniidae has been known for some time to be represented by several forms, found in littoral situations, in the Mediterranean area and in Madeira and the Canary Islands (see Beier, 1963). Recently Hoff (1963) has described a new species, *P. insulae*, from Jamaica, demonstrating that the genus occurs on the western, as well as eastern, side of the Atlantic Ocean. The present paper describes additional new species from Florida and from Puerto Rico, the occurrence of which suggests that the genus *Paraliochthonius* may be widely distributed along the Atlantic shores of America. I am indebted to Drs. P. Weygoldt and H. Heatwole for sending me the specimens from Florida and Puerto Rico, respectively. Type specimens will be deposited in the American Museum of Natural History.

Paraliochthonius weygoldti sp. n. (Figs. 1-4)

Material: Holotype male (WM875.01001), allotype female (WM875.01003) and a paratype female, collected from under wood at the drift line on Big Pine Key, Dade County, FLORIDA, by Peter Weygoldt, 30 December 1965.

Description: Male: Form typical of the genus, but rather small and pale as compared to other American species. Carapace about as long as broad; epistome small and bluntly triangular. Four corneate eyes present, the anterior pair being slightly larger than the posterior; anterior eyes about one half the ocular diameter from the carapacial margin and about the same distance from the posterior eyes. Carapacial chaetotaxy $d4d-4-4-2-2 = 16 + 2d$, the dwarf setae (*d*) being located anterior and ventral to the anterior eyes.

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Abdomen typical; pleural membranes finely granulate. Tergal chaetotaxy 4:4:5:7:7:8:8:7:7:5:T2T:0. Sternal chaetotaxy 8: [4-4]: $\frac{8-7}{(3) 6 (3)}$: (2)6(2):8:9:10:10:8:7:0: mm. Coxal chaetotaxy 2-2-1:0-3-0:2-1-CS:2-3:2-3. On each coxa II are four irregularly pinnate spines arranged in a row on a convex base (Fig. 1). No intercoxal tubercle present. Genital area typical.

Chelicera slightly shorter than length of carapace, and 1.95 times as long as broad; palm with five setae; fixed finger with six or seven moderate sized teeth; movable finger with five to seven similar but smaller teeth and with a tiny denticle midway between the distal end of the row and the finger tip; galea represented by a very slight elevation of the finger margin; serrula exterior with 17 blades; serrula interior with 11 blades; flagellum with six to eight irregularly pinnate setae, so arranged that the distal one is noticeably separated from the others (Fig. 2).

Palps not heavily sclerotized and with relatively slender setae for the genus. Proportions of segments similar to those of female, shown in Figure 3; positions of tactile setae as shown in Figure 4. Three spinelike setae on the inner face of the chelal hand, the proximal one considerably shorter and more slender than the distal two; a similar, small, spinelike seta on the inner face of the base of the movable finger. Fixed finger of chela with a row of 23 acute, widely spaced teeth; in the distal half of the row, alternate teeth are offset to the medial side and are somewhat smaller than adjacent ones. Movable finger with 23 large, acute, and widely spaced teeth. Trochanter 1.9, femur 4.0, tibia 1.8, chela 4.9 and hand 1.7 times as long as broad; movable finger 1.73 times as long as hand.

Legs of typical chthoniid facies and moderately slender. Leg IV with tactile setae on the tibia 0.37, on the metatarsus 0.24, and on the telotarsus 0.31 the length of the segment from the proximal end.

Female: Similar to the male in most respects, but slightly larger and heavier. Carapacial chaetotaxy d4d-4-4-2-2 = 16 +

2d. Abdominal tergal chaetotaxy of allotype 4:4:5:7:7:7:8:7:7:6:T2T:0. Sternal chaetotaxy 9:(3)6(3):(2)6(2):10:9:9:9:9:9:0:mm. Allotype with three spines on each coxa II; paratype with three spines on the left and four on the right.

Chelicera 2.08 times as long as broad; palm with five setae; teeth of fingers as in the male but with no indication of an isolated denticle at the distal end of the row of teeth on the movable finger; no indication of a galeal elevation; flagellum as in the male, with the distal seta distinctly separated from the others.

Palps (Figs. 4 and 5) slightly larger and less slender than in the male, otherwise very similar. Chelal teeth as in the male, 26-29 on the fixed finger and 24-27 on the movable finger. Trochanter 1.8-1.9, femur 3.8-3.9, tibia 1.8, chela 4.7-4.9 and hand 1.6-1.7 times as long as broad; movable finger 1.75-1.81 times as long as hand.

Leg IV with tactile setae on the tibia 0.39 (0.41), on the metatarsus 0.28 (0.28), and on the telotarsus 0.28 (0.32) the length of the segment from the proximal end.

Measurements (in mm): *Male*: Body length 1.11. Carapace length 0.30; anterior eye 0.037 in diameter. Chelicera 0.38 by 0.14; movable finger 0.16. Palpal trochanter 0.15 by 0.08; femur 0.32 by 0.08; tibia 0.16 by 0.09; chela 0.52 by 0.105; hand 0.19 by 0.11; movable finger 0.33 long. Leg I: basifemur 0.19 by 0.05; telofemur 0.09 by 0.05; tibia 0.11 by 0.04; tarsus 0.20 by 0.03. Leg IV: entire femur 0.33 long; basifemur 0.16 by 0.14; telofemur 0.22 by 0.12; tibia 0.22 by 0.06; metatarsus 0.11 by 0.05; telotarsus 0.22 by 0.03.

Female (the first figures are for the allotype; while in parentheses are those for the paratype): Body length 1.19 (1.22). Carapace length 0.33 (0.33); anterior eye 0.037 in diameter. Chelicera 0.33 (0.31) by 0.16 (0.15); movable finger 0.18 (0.16) long. Palpal trochanter 0.17 (0.16) by 0.09 (0.09); femur 0.38 (0.35) by 0.10 (0.09); tibia 0.19 (0.17) by 0.10 (0.09); chela 0.59 (0.56) by 0.12 (0.12); hand 0.21 (0.20) by 0.13 (0.12); movable finger 0.38 (0.35) long. Leg I: basifemur 0.22

(0.21) by 0.06 (0.06); telofemur 0.11 (0.10) by 0.05 (0.05); tibia 0.12 (0.11) by 0.04 (0.04); tarsus 0.24 (0.21) by 0.03 (0.03). Leg IV: entire femur 0.38 (0.32); basifemur 0.19 (0.16) by 0.15 (0.14); telofemur 0.25 (0.24) by 0.14 (0.12); tibia 0.25 (0.23) by 0.07 (0.06); metatarsus 0.11 (0.11) by 0.05 (0.05); telotarsus 0.24 (0.24) by 0.03 (0.03).

Paraliochthonius puertoricensis sp. n. (Figs. 5-7)

Material: Holotype male (WM934.01002), allotype female (WM934.01001), and a paratype male, collected on Ramosito Key, PUERTO RICO, by Harold Heatwole and F. McKenzie on 6 November 1964.

Description: *Male*: Form typical of the genus, larger and more heavily sclerotized than *P. weygoldti*. Carapace about as long as broad; epistome prominent, about twice as long as broad. Four eyes present, the anterior being slightly larger and better developed than the posterior; anterior eyes about half an ocular diameter from the carapacial margin and about the same distance from the posterior eyes. Carapacial chaetotaxy d4d-4-4-2-2 = 16 + 2d, the dwarf seta (d) of each side being located on the carapacial margin ventral to the level of the anterior eye.

Abdomen typical; pleural membranes finely granulate. Tergal chaetotaxy of holotype 4:4:4:6:7:7:7:7:7:4:T2T:0; paratype similar. Sternal chaetotaxy of holotype 9:[4-4]: $\frac{9-11}{(3) 6 (3)}$:(2)6(2):10:10:9:9:9:9:3T1T3:0:2; of paratype 7:[2-2]: $\frac{6-7}{(2) 6 (2)}$:(2)6(1):9:9:7:8:8:9:0:2. Coxal chaetotaxy of holotype 2-2-1:0-3-0:2-1-CS:2-3:2-3; of paratype 2-2-1:0-3-0:2-1-CS:1-3:1-3. On each coxa II of the holotype are three irregularly pinnate spines arranged in a row on a convex base (Fig. 5); in the paratype there are six spines on the right coxa II and four on the left. No intercoxal tubercle present. Genital area typical.

Chelicera barely longer than the length of the carapace and 2.25 times as long as broad; surfaces smooth except for broad areas of tiny spinules on dorsal and ventral sides of hand. Palm

of holotype with five setae; paratype with only four setae, *b* being absent. Fixed finger with six to nine moderate-sized teeth along the margin; movable finger with four or five obsolescent denticles, or merely with the finger margin irregularly roughened; no evidence of any galeal structure; serrula exterior with 21–23, and serrula interior with 14, blades; flagellum with seven or eight irregularly pinnate setae, so arranged that the distal one is noticeably separated from the others (as in *P. weygoldti*, Fig. 2).

Palps heavily sclerotized and with relatively heavy setae and spines. Proportions of the segments shown in Figure 6; positions of tactile setae as in Figure 7. In the holotype, there are four, heavy, spinelike setae on the inner face of the chelal hand and base of the fixed finger, and a similar, but smaller, seta on the inner face of the base of the movable finger; the paratype, however, has only three spinelike setae on each hand, lacking the posterior, dorsal ones found in the holotype and allotype. Fixed finger of chela with a row of 25 (26) spaced, large, acute teeth; in the distal half of the row, alternate teeth are smaller and offset to the medial side of the finger, though, not as obviously so as in *P. weygoldti*. Movable finger with 28 (31) similar teeth. Trochanter 2.0 (1.95), femur 4.6 (4.5), tibia 2.1 (2.0), chela 4.5 (4.5), and hand 1.65 (1.6) times as long as broad; movable finger 1.65 (1.75) times as long as hand.

Legs of typical chthoniid facies and moderately slender. Leg IV with tactile setae on the tibia 0.32 (0.36), on the metatarsus 0.24 (0.27), and on the telotarsus 0.06, 0.33 and 0.63 (0.04, 0.29 and 0.63) the length of the segment from the proximal end.

Female: Similar to the male in most respects, but slightly larger. Carapacial and tergal chaetotaxy like that of holotype male. Sternal chaetotaxy 10: (3)6(3): (3)6(3): 11: 9: 9: 8: 8: 8: 0: 2. Coxal area like that of holotype male, but with four spines on each coxa II.

Chelicera like that of male, 2.17 times as long as broad. Palpi with five setae. No evidence of any galeal structure.

Palps with proportions, tactile setae, and spine-like setae like those of the holotype male. Fixed finger with 27 teeth and

movable finger with 32 teeth. Trochanter 1.9, femur 4.6, tibia 2.1, chela 4.45, and hand 1.6 times as long as broad; movable finger 1.71 times as long as hand.

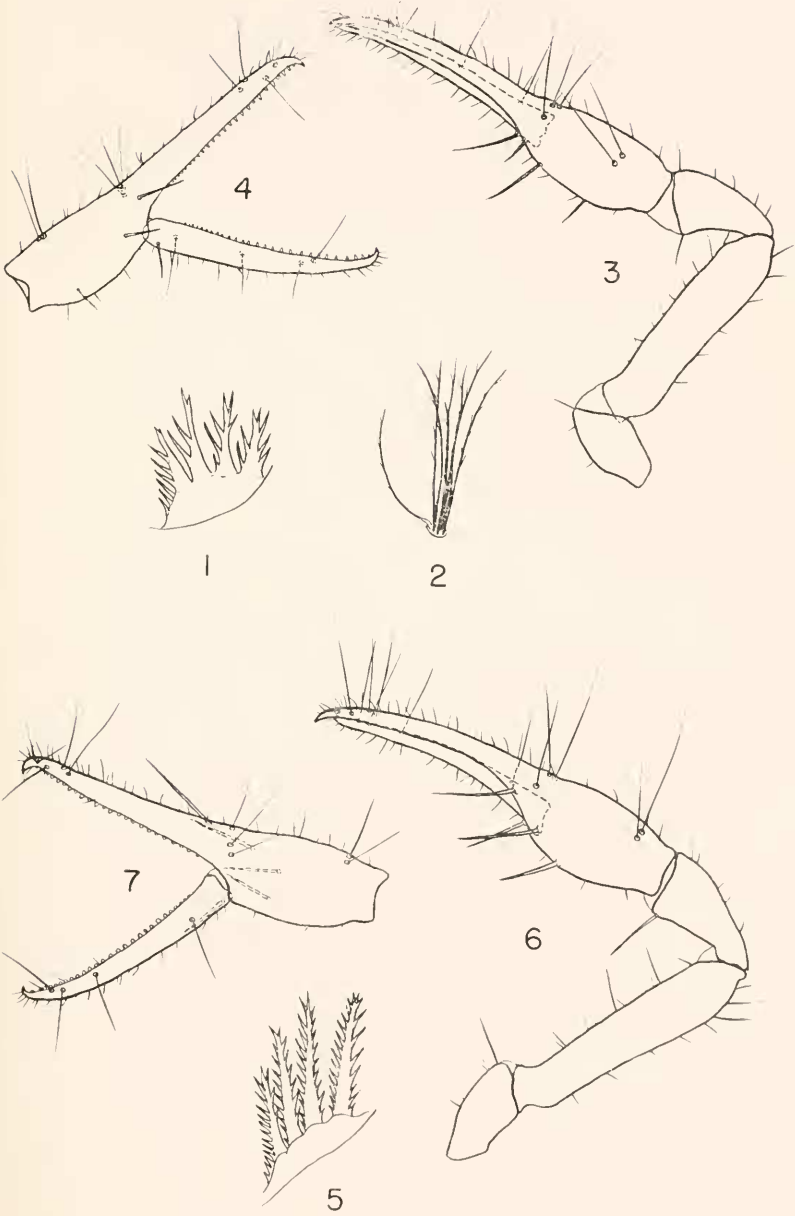
Legs as in the male, but slightly more slender. Leg IV with tactile setae on tibia 0.37, on metatarsus 0.23, and on telotarsus 0.07, 0.39 and 0.67 the length of the segment from the proximal end.

Measurements (in mm): *Male* (the first figures given are for the holotype, followed in parentheses by those for the paratype): Body length 1.83 (1.77). Carapace length 0.53 (0.50); anterior eye 0.056 in diameter. Chelicera 0.53 (0.52) long by 0.24 (0.24) broad; movable finger 0.30 (0.27) long. Palpal trochanter 0.32 (0.29) by 0.16 (0.15); femur 0.76 (0.72) by 0.165 (0.16); tibia 0.39 (0.35) by 0.19 (0.18); chela 1.09 (1.07) by 0.24 (0.24); hand 0.41 (0.38) by 0.25 (0.24); movable finger 0.67 (0.67) long. Leg I: basifemur 0.43 (0.41) by 0.09 (0.09); telofemur 0.21 (0.18) by 0.08 (0.07); tibia 0.24 (0.22) by 0.06 (0.06); tarsus 0.40 (0.42) by 0.05 (0.05). Leg IV: entire femur 0.69 (0.66) long; basifemur 0.32 (0.30) by 0.25 (0.23); telofemur 0.50 (0.48) by 0.23 (0.22), tibia 0.48 (0.47) by 0.10 (0.11); metatarsus 0.21 (0.21) by 0.08 (0.08); telotarsus 0.45 (0.47) by 0.05 (0.05).

Female: Body length 1.90. Carapace length 0.53; anterior eye 0.062 in diameter. Chelicera 0.56 by 0.26; movable finger 0.32 long. Palpal trochanter 0.32 by 0.17; femur 0.78 by 0.17; tibia 0.39 by 0.19; chela 1.11 by 0.25; hand 0.41 by 0.25; movable finger 0.70 long. Leg I: basifemur 0.44 by 0.09; telofemur 0.20 by 0.08; tibia 0.24 by 0.06; tarsus 0.42 by 0.05. Leg IV: entire femur 0.69 long; basifemur 0.30 by 0.23; telofemur 0.49 by 0.22; tibia 0.51 by 0.10; metatarsus 0.22 by 0.08; telotarsus 0.47 by 0.05.

FIGS. 1-4. *Paraliochthonius weygoldti* sp. n. 1. Coxal spines on right coxa II of holotype male. 2. Flagellum of left chelicera of holotype male. 3. Dorsal view of right palp of allotype female. 4. Medial view of left chela of allotype female.

FIGS. 5-7. *Paraliochthonius puertoricensis* sp. n. 5. Coxal spines on left coxa II of paratype male. 6. Dorsal view of right palp of holotype male. 7. Lateral view of left chela of holotype male.



Remarks: The reduced number of setae on several areas of the paratype male is considered to be an individual anomaly, inasmuch as this specimen was found in company with the other type specimens. It is possible, of course, that this individual represents a separate species; but further material will be required to clarify the issue.

A tritonymph is at hand which was collected at Spiny Butte, Puerto Rico. This specimen is probably referable to *P. puertoricensis*, but since it was not associated with adults, no definite assignment can be made at present.

It is pertinent to note here that the diagnostic criteria for the genus *Morikawia* Chamberlin (1962) are very similar to those for *Paraliochthonius*. Because of the paucity of material available, it is not possible at present to make a detailed comparison of the two genera, but it appears likely that *Morikawia* is synonymous with *Paraliochthonius*.

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